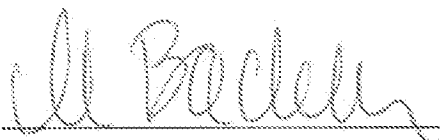


VERIFIED TRANSLATION

I, the undersigned Margareta Backen, technical translator, of Bellevuevägen 46,
S-217 72 MALMÖ, Sweden, do hereby declare:

- (1) That I am well familiar with the Swedish and English languages;
- (2) That the attached is a true and accurate translation into the English language of the Swedish text of this Patent Application entitled "Notepad" that was filed in the US Patent and Trademark Office on 7 September 1999 and at the same time a true and accurate translation of Swedish priority application No. 9903051-2 filed in the Swedish Patent and Registration Office on 30 August 1999.
- (3) That all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under § 1001 of title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: this 26st day of September 2006



Margareta Backen

UNITED STATES PATENT APPLICATION

OF

CHRISTER FÄHRAEUS

FOR

NOTEPAD

Field of the Invention

The present invention relates to a product having at least one writing surface which is provided with a position code, which codes a plurality of positions on the surface to enable electronic recording of information which is being written on the surface by means of a device which detects the position code. Furthermore, the invention relates to a device, a system, a computer program, and a method for information management. The invention also relates to a handheld electronic device which is adapted to carry out predetermined operations on command from a user.

Background of the Invention

Many people use pen and paper instead of a computer to write short texts, particularly notes of telephone conversations and meetings. The reason may be that no computer is available, that both hands are needed to efficiently enter text by way of the computer keyboard, or that it takes a long time to start the right program in the computer. Even if the notes are written on a sheet of paper, people often wish to input certain parts of them to a computer, for example a note about a meeting into a digital calendar or an address into a digital address book.

US 5,852,434 shows a device enabling a user to input handwritten and hand drawn information to a computer while the information is being written/drawn on the writing surface. The device comprises a writing surface, upon which is arranged a position code coding X-Y coordinates, and a special pen with a writing point for writing or drawing on the writing surface. Moreover, the pen has a light source for illuminating the position code and a CCD sensor for receiving the light reflected by the position code. The position information received by the CCD is sent to a computer for processing. This device appears to require a computer to be started and a certain program to be opened before the writing on the writing surface can begin.

Summary of the Invention

It is an object of the present invention to further simplify the management of handwritten information.

This object is fully or partly achieved by a product according to claim 1, a device according to claim 7, a computer program according to claim 16, a system according to claim 17, a method according to claim 19 and a handheld electronic device according to claim 20.

More specifically, according to a first aspect, the invention relates to a product having at least one writing surface which is provided with a position code, which

codes a plurality of positions on the surface to enable electronic recording of information which is being written on the writing surface by means of a device which detects the position code. Furthermore, the product has at least one activation icon which, when detected by the device, causes the device to initiate a predetermined operation which utilizes the information recorded by the device.

Thus, in addition to a writing surface, the product also has an activation icon by means of which the user can command the device to process the recorded information in a predetermined manner. As a result, it is not necessary for the user to press any keys or buttons on the device itself. Instead, she uses the activation icon on the product as a means of controlling the device. The activation icon can be likened to an icon on a computer screen, but instead of placing the computer screen cursor on the icon and clicking with the aid of the mouse, the user enters a command by placing the device so that it can detect the activation icon on the product. The product thus constitutes a new type of user interface for managing information which is written on a writing surface.

The activation icon can be in the form of an image, a symbol, text, numbers, or the like, enabling a user to

understand and remember which operation is initiated when she uses the icon. The detection of the icon with the aid of the device can be based on the above characteristics which the user utilizes to interpret the meaning of the icon or on other characteristics, such as a code which the device detects.

In this case, the written information which is recorded is any kind of information that can be created by hand, such as text, numbers, various types of characters, figures and drawings.

As mentioned above, the product thus has at least one activation icon. However, in a preferred embodiment, the product has a plurality of activation icons for activating various predetermined operations. Accordingly, the user can choose among different operations which utilize the recorded information.

The icon and the position code can be designed in many different ways. For example, they can be electrically, chemically, or mechanically detectable. They need not be detectable using the same principle. However, in a preferred embodiment, both the icon and the position code are optically detectable. In this way they are easy to apply to a product since they can, for example, be printed on it, and, moreover, a device having one or more optical sensors can be used for detecting the icon and

the position code. In this embodiment, the activation icons and the position code are passive. They only need to be capable of reflecting light. However, the light need not be in the visible range.

In principle, the activation icon can activate the device to initiate any conceivable operation which utilizes the recorded information. The choice is really only limited by the functions of the device which is to utilize the product. There may be a standard set of activation icons on the product. All devices need not be capable of using all the activation icons. In a preferred embodiment, the predetermined operation is an operation from the following group: dialing a telephone number which is part of the information, sending a fax with text which is part of the information, sending an electronic message with text which is part of the information, writing address information which is part of the information in an electronic address book, entering calendar information which is part of the information in an electronic calendar, and entering a task in an electronic list.

Different types of position codes can be used. Examples of known position codes which code each position with one symbol or a group of symbols can be found in the aforementioned US 5,852,434 and in US 5,051,736. Preferably, the position code can be of a type which codes each

position with a plurality of symbols, each symbol contributing to the coding of more than one position. Examples of how this type of overlapping or floating code can be implemented and detected can be found in Applicant's previous application No. SE 9901954-9, which was filed on the 28th of May 1999 and which is herewith incorporated by reference. The advantage of this position code is that it provides good resolution and is easy to detect since the individual symbols are not complex.

The product can be any product having a writing surface and at least one activation icon. It can be composed of two physical parts, the writing surface with the position code being located on one of the parts and the activation icon on the other. Alternatively, it can consist of a single part incorporating both the activation icon and the writing surface. In this case, the activation icon can be located on the writing surface or on some other surface. The product can, for example, be a sheet of paper with a writing surface with a position code on one part of the sheet and an activation icon on another part of the sheet. In a preferred embodiment, the product is a notepad with a plurality of writing surfaces.

Furthermore, according to a second aspect, the invention relates to a device for information management, which device is adapted to record and process information

electronically. Moreover, the device is adapted to initiate a predetermined operation, which utilizes the electronically recorded information, when it detects a predetermined activation icon.

An advantage of this device is that it is easy to use since the user does not need to learn any commands or press any buttons to open a desired program.

As mentioned above, the device will at least initiate the predetermined operation when the icon is detected. Depending on the functions of the device, it may carry out the entire operation in certain cases. In other cases, the device can, for example, automatically transfer the recorded information and information about the operation to be carried out to an external unit, for example a PC or a mobile telephone, which finishes the operation. This transfer can take place immediately or at a later time. In this application, the term "initiate" refers to the fact that, even if the device does not carry out the operation, it ensures that the operation is carried out so that the user does not need to issue further commands to the device or to the external unit in order for the operation to be carried out. However, the user may need to supply additional information and or confirm the operation/information.

The device can record information in different ways. It can comprise a sensor, for example an accelerometer, which records the movement of the device when the device is being used for writing on a writing surface. Furthermore, it can comprise a scanner, which scans the information. However, in a preferred embodiment, the device is adapted to record information by detecting a position code located on a writing surface upon which the information is written by hand. This embodiment is advantageous because the information is recorded at the same time as it is being written and the same sensor can be used for recording the written information and for detecting the activation icon. In this embodiment, the position code is continuously detected while the information is being written, a series of position indications being obtained which define how the device has been moved.

As indicated above, the device can use different types of sensors depending on the technology used to implement the position code and the activation icon. In a preferred embodiment, the device comprises an optical sensor for detecting the activation icon. Moreover, the device advantageously comprises an optical sensor which is adapted to record images of the writing surface and a signal processor which is adapted to use the position code in the images to create a digital representation of

the information, the predetermined operation being carried out on the digital representation of the information. The optical sensors are advantageous because they enable the information recording and the initiation of the predetermined operation to be based on image processing, which is a well-known and well-developed technology.

While the device can be implemented with two sensors of the same or different types, the device will be less expensive and easier to use if it is implemented with a single sensor for recording information as well as for detecting the activation icon.

According to a third aspect of the present invention it relates to a computer program for information management, which is stored in a memory medium which can be read by a computer and which comprises instructions for causing the computer to detect an activation icon in an image and to initiate a predetermined operation in response to the detection of the activation icon. The advantages of this program are apparent from the above discussion.

According to a fourth aspect of the present invention it relates to a system for information management, comprising a product provided with at least one activation icon which indicates a predetermined operation, as well as a device which is adapted to record the informa-

tion electronically and which is adapted to initiate the predetermined operation with respect to the recorded information when it detects the activation icon.

The advantages of the system are apparent from the above discussion.

According to a fifth aspect of the invention it relates to a method of managing information, comprising the steps of writing the information on a writing surface using a pen; recording the written information electronically using a device; and causing the device to initiate a predetermined operation with respect to the recorded information by causing the device to detect an activation icon.

This method enables the user to manage information in a very simple way. She can write down information as usual on a sheet of paper with a device comprising a pen and still immediately initiate one or several operations, which normally require a special computer program to be started and subsequently information to be input to a computer, just by causing the device to detect an activation icon. According to the invention, it is not necessary to write down the information prior to the detection of the activation icon. It is also conceivable to cause the device to detect the activation icon prior to writing the note.

The above technology could also be used for general control of handheld computers and other handheld electronic devices, such as mobile telephones, PDAs, reading pens, and handheld scanners. The user controls such devices by selecting, with the aid of one or a few buttons, from menus or among icons shown on the computer screen. These devices could be controlled in an easier way by utilizing activation icons which activate predetermined operations normally implemented by pressing buttons.

For this purpose, according to another aspect, the invention relates to a handheld electronic device which is adapted to carry out predetermined operations on command from a user. This device has an optical sensor for detecting at least one activation icon, and a signal processor which is adapted to carry out one of said predetermined operations when the optical sensor detects the activation icon.

The device can especially be a reading pen of the C-PenTM type sold by the Applicant. Such a pen is described in, for example, SE 9604008-4. This device is controlled with the aid of buttons and menus shown on a display. The control could be simplified through the use of activation icons.

The activation icon or icons can, for example, be located on a product of the mouse pad type, on a sheet of paper, or on some other product which is easily accessible to the user. The predetermined operation can be any operation which a user normally instructs a handheld device to carry out with the aid of a mouse, buttons, or keys on a keyboard. Examples of such operations include starting or closing a program and saving or deleting information which has been recorded.

Naturally, where applicable, the above statements regarding the device for information management also apply in this case.

Brief Description of the Drawings

The present invention will be described in more detail below by way of an embodiment with reference to the appended drawings, in which

Fig. 1 schematically illustrates an embodiment of the product according to the invention in the form of a notepad;

Fig. 2 schematically illustrates an embodiment of a device according to the invention.

Detailed Description of a Preferred Embodiment

Fig. 1 shows a notepad 1 with several sheets 2 of paper. The top sheet has a writing surface 3 and a command field 4.

On the writing surface 3 there is printed a position code 5, which is composed of symbols 6 of a first and a second type 6a, 6b and more specifically a dot having a larger radius and a dot having a smaller radius, corresponding to a "one" and a "zero" respectively. For the sake of clarity, the dots have been enlarged and the position code is only shown on a small part of the writing surface. In a real embodiment the position code extends across the entire writing surface and the symbols are smaller to ensure better position resolution.

The position code can be created in a number of different ways. One way of creating a position code where each position is coded with one symbol is described in US 5,852,434. However, in the present invention, each position is advantageously coded with the aid of a plurality of symbols and the coding is such that each symbol contributes to the coding of more than one position. This means that two adjoining positions share some symbols, as indicated in Fig. 1 by the dashed areas 5a, 5b. In this way, a higher resolution is achieved and the detection becomes easier since the individual symbols can be less complex. This type of overlapping or floating position code can be created with the aid of a computer. A special way of generating such a floating position code is described in Applicant's previous Patent Application

No. 9901954 which was filed on the 28th of May 1999 and which is herewith incorporated by reference.

In the command field 4 there are printed seven different activation icons 7a-g which can be used for commanding a device to initiate or carry out different operations. The icons 7a-g are graphically designed in such a way that the user understands which operation is activated by the icon. In this example, the icons comprise images, but they can also comprise text and numbers.

Fig. 2 shows a device which can be used for writing text and drawing figures on the writing surface and for carrying out operations triggered by the activation icons.

The device comprises a casing 11 having approximately the same shape as a pen. In the short side of the casing there is an opening 12. The short side is intended to abut against or be held a short distance from the writing surface and the command field.

The casing essentially contains an optics part, an electronic circuitry part, and a power supply. The optics part comprises at least one light-emitting diode 13 for illuminating the surface which is to be imaged and a light-sensitive area sensor 14, such as a CCD or CMOS sensor, for recording a two-dimensional image. The device may also comprise a lens system (not shown).

The power supply to the device is obtained from a battery 15, which is mounted in a separate compartment in the casing.

The electronic circuitry part comprises a signal processor 16. The signal processor is implemented with the aid of a microprocessor and it contains software for analyzing images from the sensor for creating a digital representation of what is being written on the writing surface and for detecting the activation icons. Moreover, it comprises software for initiating or carrying out the operations indicated by the activation icons. Finally, it may also comprise user software, such as address book software to help the user to keep track of address information, calendar software to help the user to keep track of calendar information, such as meetings, birthdays, and other information one would normally put in a calendar or diary, as well as to-do-list software so that the user can enter tasks which she is to carry out.

Advantageously, the signal processor also comprises ICR software which can be used for interpreting recorded characters so that they can be stored, processed, or transferred in character-coded format.

Finally, the electronics circuitry part also comprises a mobile telephone unit which comprises a mobile telephone transceiver 17, which makes it possible to

telephone, send faxes, and send e-mail messages to an external unit in the form of a telephone, a fax machine, or a computer.

Furthermore, on the casing of the device there is a pen point 18, by means of which the user can write ordinary pigment-based writing on the writing surface. The pen point 18 is extendable and retractable so that the user can control whether or not it is to be used.

Moreover, the device comprises buttons 19 by means of which the user can activate and control the device for operations which are not controlled by the activation icons. It also comprises a transceiver 20 for wireless transfer, e.g. using IR light or radio waves, of information across short distances. This wireless transfer can be used when the device cannot carry out the entire initiated operation itself and needs to transfer the recorded information and information about the operation to be carried out to an external unit.

Finally, the device also comprises a display 21 for showing, for example, recorded information.

Applicant's Swedish patent No. 9604008-4 describes a device for recording text. If programmed in a suitable way, this device can be utilized for recording information which is being written on a writing surface provided with a position code, for detecting activation icons, and

for initiating/carrying out operations activated by the activation icons.

The operation of the notepad in Fig. 1 and the device in Fig. 2 will be described below.

Suppose that a user receives a telephone call. She writes her notes on the notepad 1 with the aid of the pen point 18 of the device. For example, suppose that the person who telephones wants the user to telephone Jack at a certain telephone number. In this case, the user writes "Phone Jack 9857299" on the notepad 1.

While the user is writing the optical sensor 14 continuously captures images of the writing surface 3 in the current position of the pen. The images contain the position code 5. The signal processor 16 localizes the position code in each image and, on the basis of this code, determines the coordinates of the absolute position on the writing surface in which each image was captured. In this way, a description, in the form of a large number of position indications, is obtained of how the pen is being moved across the sheet. This description constitutes a digital representation of the written information. The position indications can, if necessary, be fed as an input signal to the ICR software, which determines the characters to which the positions correspond, so that

the information can be stored in character-coded format instead of as a series of position indications.

When the user has finished her telephone conversation she places the device on the uppermost icon, which looks like a telephone. When the device detects the telephone icon it starts a program for dialing a telephone number with the aid of the mobile telephone transceiver 17. The dialing program fetches the numbers of the telephone number directly from the recorded information. The program shows the numbers on the display 21 and waits for the user to confirm by pressing a button that the number is correct and that it should actually be dialed. When this has been done, the number is dialed automatically and the user can speak to Jack.

The detection of the activation icon can be carried out in different ways. For example, it can be effected on the basis of the same information the user uses to determine which icon she should use, i.e. the image or text content in the command field 4. In another example, the position code can extend across the command field, the icons thus being superimposed on the position code or vice versa. In this case, the image of the icon will also contain the position code. Since a certain icon is always in the same location, the icon detection can thus be based on the detection of a certain position. As yet

another alternative, the icon can be provided with another code, for example a bar code, or symbols, or other distinctive features which make it possible to identify the activation icon.

Another example of how the notepad and the pen can be used is as follows: The user remembers that she is supposed to pick up her car at 4 p.m. at the garage, and she writes a note on her notepad saying "pick up car at 4 p.m.". This information is recorded in the pen with the aid of the position code. The user then places the pen on the calendar program icon 7e, whereupon the pen detects it and activates the calendar program. The program fetches the recorded information. Naturally, if it is in the form of position indications it can only be stored as position indications in the calendar program. In this case, the program can suggest that the note be entered under today's date and the user can confirm this by pressing a button on the pen. However, if the information is in character-coded format, the program can interpret "4 p.m." as time indication and enter the note under this time and set an alarm.

The other activation icons can be used in a similar way.

The fax icon 7b can be used if the user wishes to send a fax. In this case, the user writes her fax message

on the writing surface and activates the fax program with the aid of the icon 7b. The fax program asks where it should send the fax. The user can retrieve this information from an electronic address book in the pen or write it by hand with the pen on the sheet of paper. Subsequently, the fax program composes the fax automatically and sends it by the intermediary of the mobile telephone transceiver 17 to the intended recipient.

Correspondingly, e-mail messages can be composed and sent by activating the e-mail icon 7c.

Information for an address book or a to-do-list can be managed in the same way as the information for the calendar program with the aid of the address book icon 7d and the to-do-list icon 7f.

Finally, notes can be deleted from the pen's memory with the aid of the recycle bin icon 7g.

In another embodiment, the device in Fig. 2 can be controlled with the aid of activation icons which can be of a design similar to that of the icons on the notepad in Fig. 1, but which relate to operations such as opening and closing programs and other operations which the user normally commands by means of the buttons 19 on the device.

What I claim and desire to secure by Letters Patent is:

1. A product having at least one writing surface (3) which is provided with a position code (5), which codes a plurality of positions on the surface to enable electronic recording of information which is being written on the writing surface, by means of a device which detects the position code, characterized in that the product also has at least one activation icon (7) which, when detected by the device, causes the device to initiate a predetermined operation which utilizes the information recorded by the device.

2. A product according to claim 1, which product comprises a plurality of activation icons (7a-g) for activating various predetermined operations.

3. A product according to claim 1 or 2, wherein the icon and the position code are optically detectable.

4. A product according to any one of the preceding claims, wherein the predetermined operation is an operation from the following group: dialing a telephone number which is part of the information, sending a fax with text which is part of the information, sending an electronic message with text which is part of the information, writing address information which is part of the information in an electronic address book, entering

(continued)

(continued claim 4)

calendar information which is part of the information in an electronic calendar, and entering a task in an electronic list.

5. A product according to any one of the preceding claims, wherein the position code comprises a plurality of symbols (6) and wherein each symbol contributes to the coding of more than one position.

6. A product according to any one of the preceding claims, which product is a notepad with a plurality of writing surfaces.

7. A device for information management, which device is adapted to record and process information electronically, characterized in that the device is also adapted to initiate a predetermined operation, which utilizes the electronically recorded information, when it detects a predetermined activation icon (7a-g).

8. A device according to claim 7, which device is adapted to record information electronically by detecting a position code which is located on a writing surface, upon which the information is written by hand.

9. A device according to claim 7 or 8, which device comprises an optical sensor, which is adapted to detect the activation icon.

10. A device according to claim 8 or 9, which device comprises an optical sensor, which is adapted to record images of the writing surface and a signal processor which is adapted to utilize the position code in the image to create a digital representation of the information, the digital representation of the information being used in the predetermined operation.

11. A device according to claim 10, wherein the signal processor comprises a character interpretation function which is adapted to convert the recorded information to character-coded format so that the digital representation of the information is at least partially in character-coded format.

12. A device according to any one of claims 7-11, further comprising a mobile telephone transceiver for transferring the recorded information from the device to an external unit, the predetermined operation being an operation from the following group: dialing a telephone number which is part of the information, sending a fax with text which is part of the information, and sending an electronic message with text which is part of the information.

13. A device according to any one of claims 7-12, which device comprises at least one computer program of

(continued)

(continued claim 13)

the address book or calendar or to-do-list type, the predetermined operation consisting of entering a piece of information which is part of the recorded information in a register for use in any of said computer programs.

14. A device according to any one of claims 7-13, which device is handheld.

15. A device according to any one of claims 7-14, further comprising a pen point for writing the information on the writing surface.

16. A computer program for information management, which is stored in a memory medium which can be read by a computer and which comprises instructions for causing the computer to detect an activation icon in an image and to initiate a predetermined operation in response to the detection of the activation icon.

17. A system for information management, comprising a product which is provided with at least one activation icon indicating a predetermined operation, as well as a device, which is adapted to record information electronically and which is adapted to initiate the predetermined operation with respect to the recorded information when it detects the activation icon on the product.

18. A system according to claim 17, further comprising a writing surface, which is provided with a position code which codes a plurality of positions on the writing surface, the device being adapted to record the information electronically by detecting the position code on the writing surface.

19. A method of recording and processing information, comprising the steps of writing information on a writing surface using a pen; recording the written information electronically using a device; c h a r a c t e r - i z e d by the step of causing the device to carry out a predetermined operation with respect to the recorded information by letting the device detect an activation icon.

20. A handheld electronic device which is adapted to carry out predetermined operations on command from a user, c h a r a c t e r i z e d by an optical sensor for detecting at least one activation icon, and a signal processor which is adapted to carry out one of said predetermined operations when the optical sensor detects the activation icon.

Abstract of the Disclosure

A system for information management consists of a product, for example a notepad, which has a writing surface (3) with a position code (5), which codes a plurality of positions on the surface, and a device, which is adapted to record the information which is being written on the writing surface by detecting the position code. Moreover, on the product there are a number of activation icons (7a-g). When such an activation icon is detected by the device, the device initiates a predetermined operation which utilizes the recorded information. Such an operation can, for instance, consist of dialing a telephone number which is part of the recorded information.

A product, a device, and a computer program for information management are also shown.

Elected for publication: Fig. 2

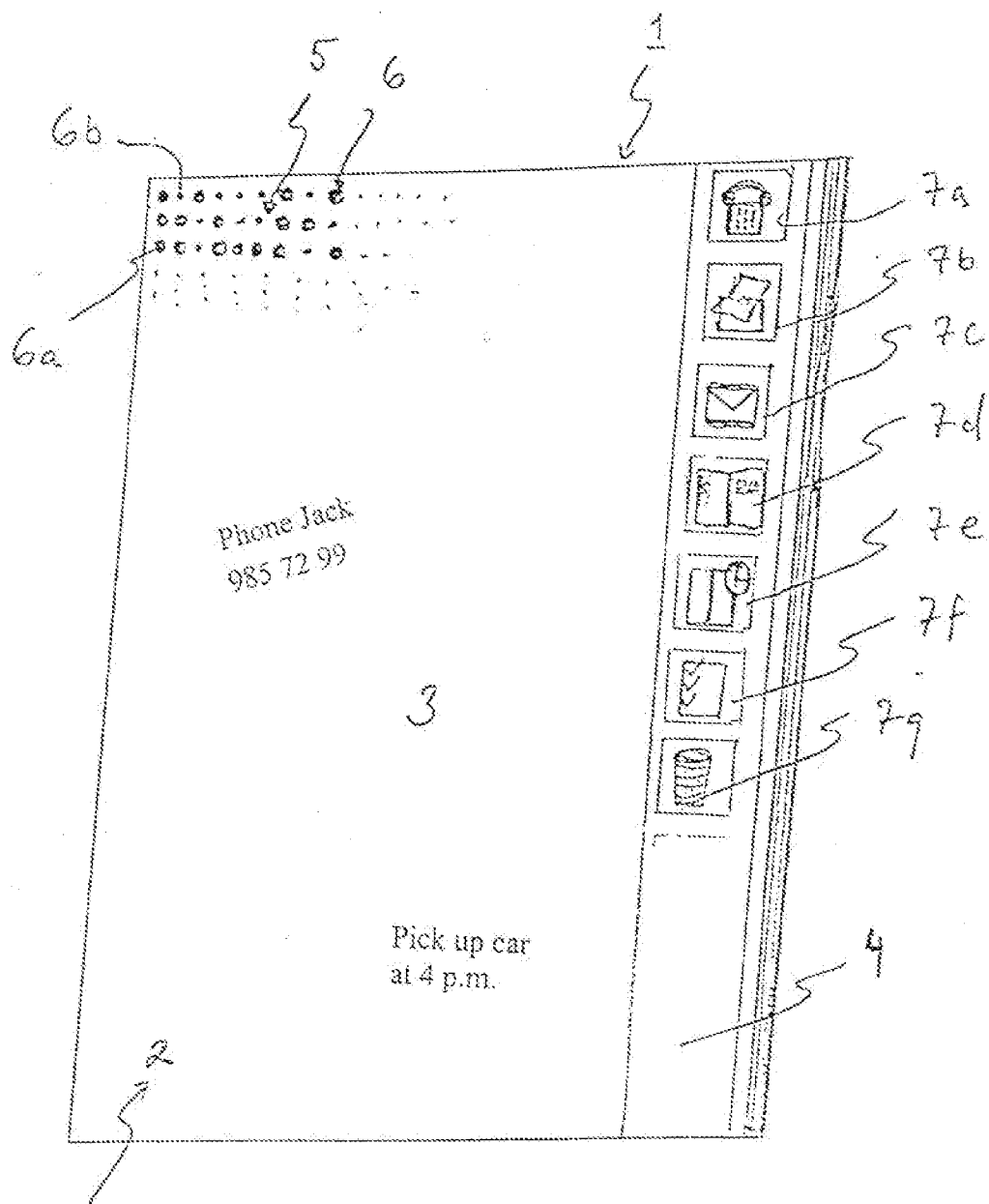


Fig. 1

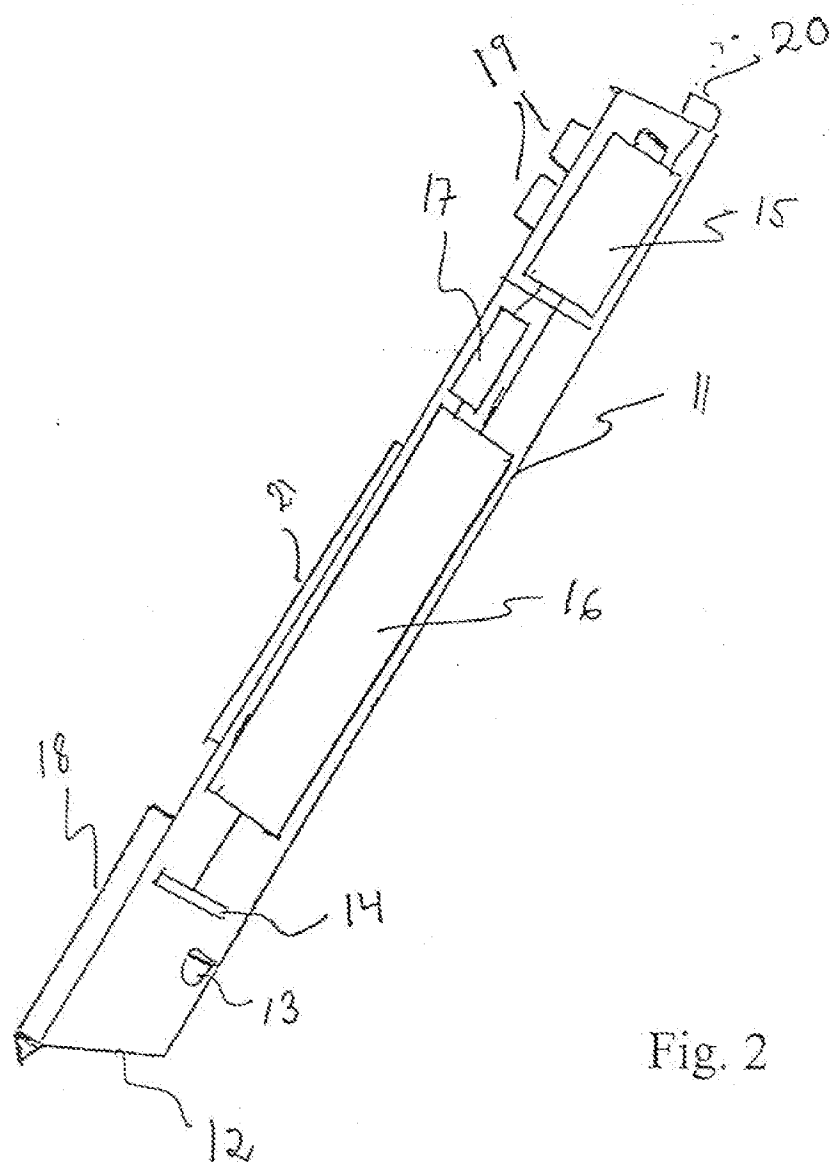


Fig. 2